

ABSTRACT

GEOGRAPHICALLY WEIGHTED REGRESSION MODELING WITH FIXED GAUSSIAN KERNEL WEIGHTS ON TUBERCULOSIS CASES DATA IN NORTH SUMATRA PROVINCE

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Multiple linear regression is often used to analyze the relationship between variables, but it is less effective in handling data with spatial heterogeneity. Geographically Weighted Regression (GWR) overcomes this limitation by considering geographical aspects in parameter estimation. This study applies GWR to analyze the factors affecting the number of Tuberculosis (TB) cases in North Sumatra, using variables such as BCG immunization, population density, access to sanitation, education, and health facilities. The GWR model with a fixed Gaussian kernel performed better than multiple linear regression, with an AIC value of 327.431 (smaller than 372.018 in multiple linear regression), confirming that this model is more suitable in capturing the spatial variation of TB distribution. These findings can support location-based health policies for more effective TB control.

Keywords: Geographically Weighted Regression, Tuberculosis, Spatial Heterogeneity, North Sumatra, Spatial Modeling.